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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/071,915	02/08/2002	Kujin Lee	1772-4	4259

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04/08/2005

EXAMINER

HERNANDEZ, NELSON D

ART UNIT	PAPER NUMBER
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2612

DATE MAILED: 04/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/071,915

Applicant(s)

LEE ET AL.

Examiner

Nelson D. Hernandez

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10 is/are allowed.
- 6) ☒ Claim(s) 1,3,4,6,7,9 and 11 is/are rejected.
- 7) ☒ Claim(s) 2,5 and 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 6/10/02 & 7/28/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 8 is objected to because of the following informalities: the claim needs to be finish with a period ".". Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1, 3, 4, 6, 7 and 11** rejected under 35 U.S.C. 103(a) as being unpatentable over Gilbert, US Patent 6,323,858 B1 in view of McCutchen, US Patent 5,023,725 and further in view of Endo, Us Patent 6,335,754 B1.

Regarding **claim 1**, Gilbert discloses an omni-directional image data acquisition apparatus (Figs. 2, 5A, 5B and 6), comprising: a multi-camera module (Figs. 5A, 5B and 6) constructed in a manner that a plurality of cameras are symmetrically arranged with a specific point in a plane (See figs. 5A and 5B), each of the cameras taking charge of each of divided angles such that the camera module can take an omni-directional continuous panoramic photograph of surrounding objects with the specific point; first frame grabbers (Fig. 6; FIFO memories 45a-45f) each of which is electrically connected to each of the cameras of the multi-camera module, to grab photographed images by frames; an exposure calculator (Control computer in fig. 1A: 20, controls the exposure for each camera by using the embedded controller in fig. 2: 48) electrically connected to

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the first frame grabbers, to calculate exposure of each camera, based on the grabbed images by frames; an exposure signal generator (Fig. 2: 48) electrically connected to each camera, to transmit information about the exposure as a signal on the basis of the exposure calculated by the exposure calculator; storage means (FIFO memories in fig. 2, items 47h-47j) electrically connected to the each first frame grabber, to store images photographed by the cameras according to photographing location and photographing time (storing the images in real time); a GPS sensor (See col. 5, lines 27-38) to sense the photographing location; an annotation entering unit (See fig. 3B: 34c) electrically connected to the GPS sensor to calculate location and time corresponding to each frame based on sensed data of the GPS sensor, the annotation entering unit being electrically connected to the storage means to enter the calculated location in each frame as annotation; and a trigger signal generator (Computer in fig. 4B: 20 is connected to the storage means in fig. 4B: 21, the annotation unit is part of the computer 20 (i.e. mouse, keyboard and also the GPS information is received by the computer)) electrically connected the storage means, the exposure signal generator, the annotation entering unit, the trigger signal generator selectively transmits a trigger signal to the exposure signal generator or the annotation entering unit in order that the cameras start to photograph the objects according to the trigger signal (Col. 3, line 42 – col. 5, line 38; col. 8, lines 16-65; col. 12, lines 6-45; col. 14, lines 55-67).

Gilbert does not explicitly disclose the apparatus as a 3-Dimensional acquisition apparatus, that the GPS senses the photographing time, that the annotation unit enter

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the time and that the multi-camera module are vertically stacked and formed in at least two layers in the direction of height.

However, McCutchen teaches an omni-directional imaging comprising a plurality of cameras (See figs. 2, 19, 20 and 21) for capturing omni-directional images, wherein the system is capable of obtaining 3-Dimensional data by using two images taken at different points of view; McCutchen also teaches the multi-camera module are vertically stacked and formed in at least two layers in the direction of height (Fig. 19 teaches a layer of cameras formed on top of a second layer of camera) (Col. 11, lines 14-32; col. 19, line 53 – col. 21, line 33).

Therefore, taking the combined teaching of Gilbert in view of McCutchen as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gilbert by obtaining 3-Dimensional data based on two images taken at different points of view and having the multi-camera module vertically stacked and formed in at least two layers in the direction of height. The motivation to do so would help the omni-directional image data acquisition to increase the resolution of the images taken since the number of cameras increases, also would present the images to the viewer as if were looking around him on the photographed spot.

The combination of Gilbert in view of McCutchen does not teach that the GPS senses the photographing time and that the annotation unit enters the time.

However, Endo teaches a panoramic imaging system (See fig. 8), wherein a GPS senses the location data and the time data and the panoramic imaging system

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stores the time and location data with the image data in a hard disk (Col. 7, line 10 – col. 11, line 45).

Therefore, taking the combined teaching of Gilbert in view of McCutchen and further in view of Endo as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the image data acquisition by having a GPS senses the location data and the time data so the image data acquisition annotates the time of exposure to each image taken. The motivation to do so would help identifying the images so as to be searched at a later time as suggested by Endo (Col. 8, lines 1-45).

Regarding **claim 3**, Gilbert teaches that the storage means is one of digital storage devices comprised of a hard disk, compact disk and memory (Col. 8, lines 33-36).

Regarding **claim 4**, Gilbert inherently teaches an audio digital converter electrically connected to the storage means, the audio digital converter converting an audio signal sensed by an audio sensor into a digital signal as an audio clip to correspondingly attach to each image or image group to be stored in the storage means by teaching that received audio data can be added to the image data for each frame (See Fig. 11) (Col. 13, line 24 – col. 14, line 30).

Regarding **claim 6**, Gilbert discloses that the multi-camera module further comprises at least one camera placed at the top thereof so that the camera can photograph an object upward (See fig. 1A: 41e). Grounds for rejecting claim 1 apply here.

Regarding **claim 7**, the combined teaching of Gilbert in view of McCutchen and further in view of Endo as applied to claim 1 teaches mobile means, on which the multi-camera module is mounted, to enable continuous panoramic photographing of the camera module while moving (See figs. 14 and 27-34) (Col. 7, lines 10-16; col. 14, line 54 – col. 15, line 36).

Regarding **claim 11**, the combined teaching of Gilbert in view of McCutchen and further in view of Endo teaches the same as in claim 1. Therefore, grounds for rejecting claim 1 apply here.

4. **Claim 9** is rejected under 35 U.S.C. 103(a) as being unpatentable over McCutchen, US Patent 5,023,725 in view of Ijima, US Patent 6,445,814 B2.

Regarding **claim 9**, McCutchen discloses a method for acquiring 3-dimensional data, comprising the steps of: acquiring for multi images of an object in the direction of height photographed by the cameras, the multi camera module (See figs. 2, 19, 20 and 21) including a plurality of cameras which are symmetrically arranged at a specific point in a plane, and which take charge of each allocating viewing angle calculated by 360° divided by the number of the cameras; searching for corresponding points in each image, McCutchen also teaches obtaining 3-Dimensional data by using two images taken at different points of view (Col. 10, line 55 – col. 11, line 32; col. 12, lines 50-62; col. 11, lines 14-32; col. 15, lines 32-50; col. 16, line 56 – col. 19, line 3; col. 19, line 53 – col. 21, line 33). McCutchen does not explicitly disclose extracting for distance information using trigonometry; and acquiring for 3-dimensional image data, based on the distance information.

However, Ijima teaches a three-dimensional image capturing device (Fig. 2) comprising: an image capturing processor (Fig. 2: 7) that obtains image data of a subject (Fig. 2: 2); a pair of image sensors (Figs. 3A, sensors 102R and 102L) for capturing two images of a subject with different point of view; a distance measurement data detecting processor (Fig. 2: 6) that based on two captured images, detects distances from said device to points on a surface of said subject by using trigonometric measurement on the basis of the relationship among corresponding points in said captured images, a three-dimensional image data storing processor (Fig. 22: 220) that stores said image data and said distance measurement data in a recording medium (Fig. 22: 250) (Col. 10, lines 34-68; col. 12, lines 30-39; col. 12, line 63 – col. 13, line 19; col. 14, lines 15-44; col. 15, lines 1-52; col. 19, line 24 – col. 20, line 21; col. 22, lines 48-53, also col. 25, lines 15-35).

Therefore, taking the combined teaching of McCutchen in vie of Ijima as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify McCutchen by using a distance measurement data detecting processor that, based on a pair of captured images, detects distances from said device to points on a surface of said subject by using trigonometric measurement on the basis of the relationship among corresponding points in said captured images to acquire 3-dimensional data. The motivation to do so would help to accurately obtain 3-D shape information data that can be output to a display so the viewer can observe and feel as if an actual object were present there (Col. 4, lines 12-42; col. 5, lines 9-14 and 39-42; col. 7, lines 36-54; col. 32, lines 8-21).

Allowable Subject Matter

5. **Claim 10** is allowed.
6. **Claims 2, 5 and 8** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
7. The following is a statement of reasons for the indication of allowable subject matter:

Regarding **claim 10**, the main reason for indication of allowable subject matter is because the prior art fails to teach or reasonably suggest selectively extracting for regions in the multi images, wherein the regions have constant exposure amount and acquiring for images of dynamic range extension, which are generated by composing the extracting regions.

Gilbert teaches a method for controlling the exposure time of images, comprising the steps of: acquiring for multi images of an object, the multi images are photographed by the cameras, which have different exposure amount each other, wherein the multi camera module comprising a plurality of cameras (Figs, 5A, 5B and 6) which are symmetrically arranged at a specific point in a plane, and which take charge of each allocating viewing angle calculated by 360° divided by the number of the cameras (Col. 3, line 42 – col. 5, line 38; col. 8, lines 16-65; col. 12, lines 6-45; col. 14, lines 55-67). However, Gilbert fails to teach or reasonably suggest selectively extracting for regions in the multi images, wherein the regions have constant exposure amount and acquiring

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for images of dynamic range extension, which are generated by composing the extracting regions.

Regarding **claim 2**, the main reason for indication of allowable subject matter is because the prior art fails to teach or reasonably suggest a plurality of light intensity sensors electrically connected to the exposure calculator to allow the exposure calculator to be able to calculate the exposure amount of the each camera based on external light intensity.

Regarding **claim 5**, the main reason for indication of allowable subject matter is because the prior art fails to teach or reasonably suggest a video camera electrically connected to the storage means via a second frame grabber for grabbing photographed moving pictures by frames, to the storage means a unique video clip corresponding to each image or image group to be stored in the storage means.

Regarding **claim 8**, the main reason for indication of allowable subject matter is because the prior art fails to teach or reasonably suggest a distance sensor and a direction sensor for respectively sensing the distance and direction of the image photographed by each camera.

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nelson D. Hernandez whose telephone number is (571) 272-7311. The examiner can normally be reached on 8:30 A.M. to 6:00 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy R. Garber can be reached on (571) 272-7308. The fax phone

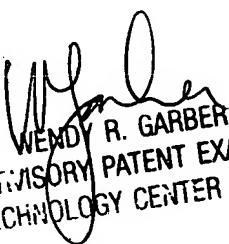
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number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Nelson D. Hernandez
Examiner
Art Unit 2612

NDHH
April 1, 2005


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